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MATHEMATICS
Preparation 10

Module 3

Patterns and Algebra

Learning Technologies Branch

Assignment Booklet 3A

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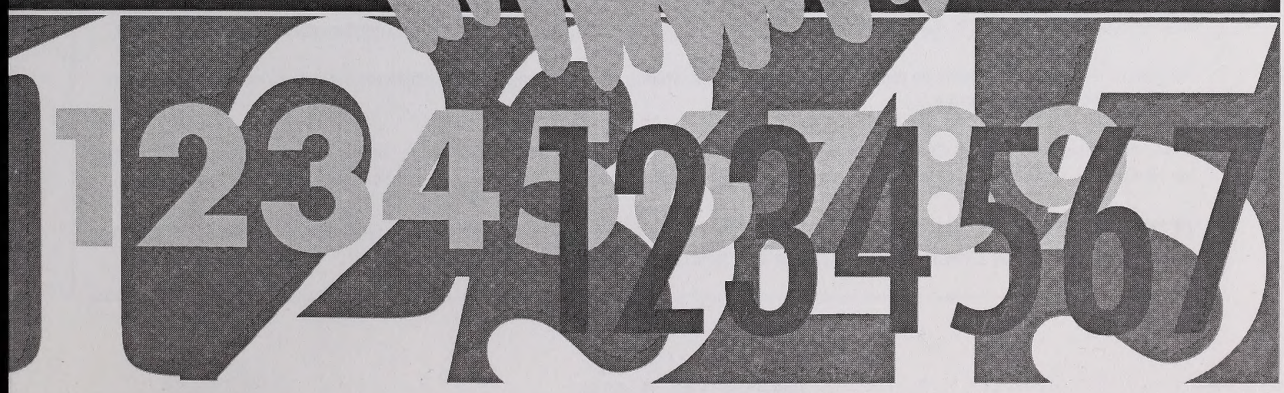

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Summary

	Total Possible Marks	Your Marks
Section 1 Assignment	25	

Teacher's Comments

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Parents	
General Public	
Other	

Mathematics Preparation 10
Module 3: Patterns and Algebra
Assignment Booklet 3A
Section 1 Assignment
Learning Technologies Branch
ISBN 0-7741-1760-5

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ASSIGNMENT BOOKLET 3A
MODULE 3: PATTERNS AND ALGEBRA
SECTION 1 ASSIGNMENT

Your mark for this module will be determined by how well you do your assignments in the Assignment Booklets.

This Assignment Booklet is worth 25 marks out of the total 100 marks for Module 3.

Work slowly and carefully. If you are having difficulties, go back and review the appropriate topic.

Be sure to proofread your answers carefully.

(25)

Section 1 Assignment: Using Algebra

Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.

1. Translate the following phrases into algebraic expressions.

(1) **a.** five more than triple a number

_____

(1) **b.** You will be paid double the amount per hour.

_____

(1) **c.** The inheritance will be shared equally among the 3 siblings.

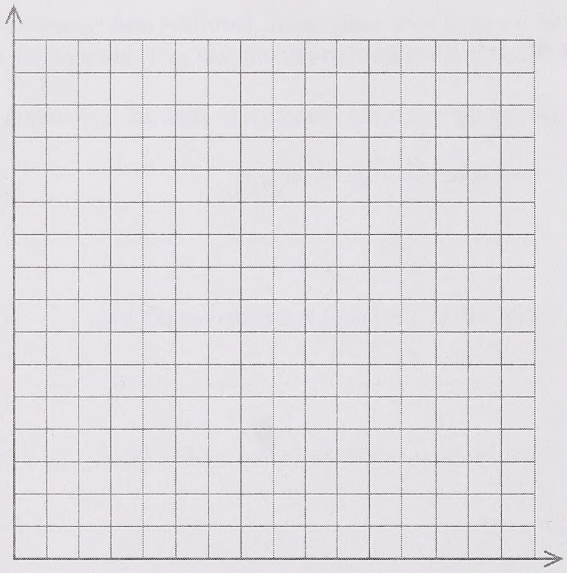
_____

2. A bicycle shop rents and sells bicycles. The cost of renting a bicycle is \$15 plus \$3 for every $\frac{1}{2}$ h.

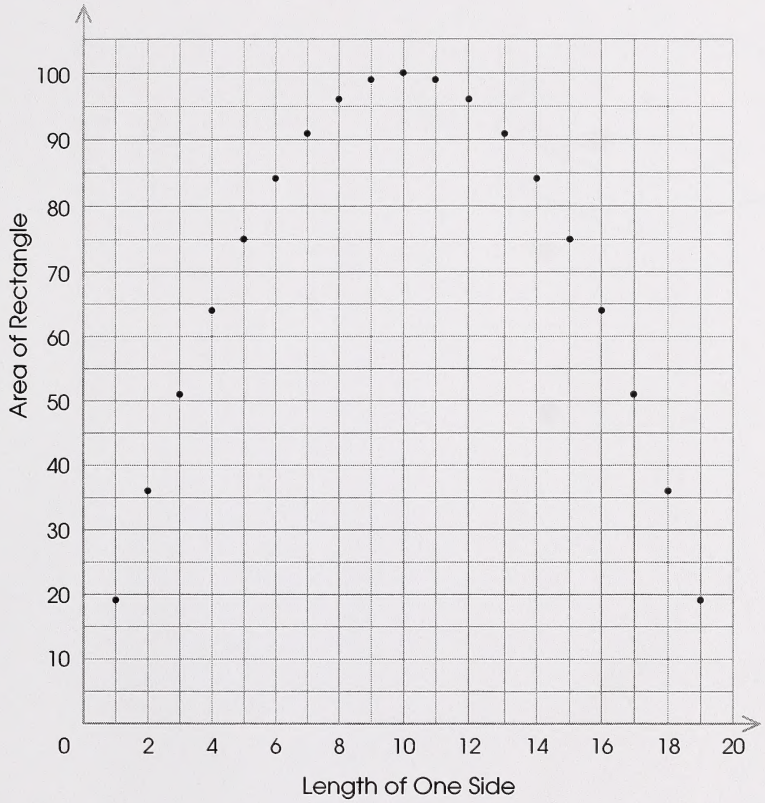
(1) **a.** Determine the rule or formula for calculating the cost of renting a bicycle.

(1) **b.** Using the formula from question 2.a., determine the cost of renting a bicycle for 4 h.

(2) **c.** On the grid provided, make a graph to show the relationship between the time and the cost of renting a bicycle. Assume the longest a person rents a bicycle is 8 h and the rental charge is by the half-hour.



3. The following graph has the length of a rectangle along the horizontal axis and the corresponding area of the rectangle along the vertical axis. All the rectangles represented by the points have the same perimeter.



(2) **a.** Determine the perimeter of the rectangles represented on the graph. **Hint:** Three of the points on the graph are $(4, 64)$, $(6, 84)$, and $(8, 96)$.

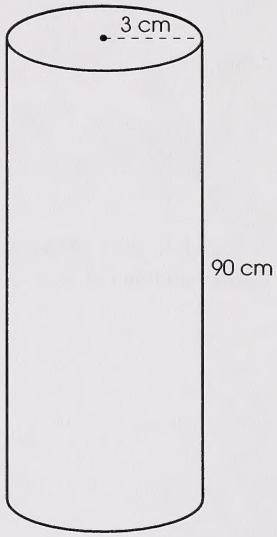
(1) **b.** The maximum y-value of this graph is 100. The maximum point occurs at $(10, 100)$. What is the significance of this ordered pair?

_____

_____

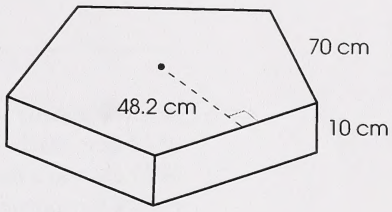
(4)

4. Cylindrical tubes are designed to store posters. The length of these tubes is 90 cm and the radius is 3 cm. Calculate the surface area and volume of each tube. Round your answers to the nearest tenth.

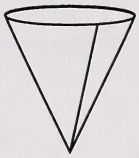


(4)

5. It is popular to make pathways with cement bricks that are available in many shapes and sizes. One such cement brick is in the shape of a regular pentagon. Each side of the pentagon is 70 cm. The apothem of the base is 48.2 cm and the depth of the brick is 10 cm. Determine the surface area and the volume of this brick.



(1) **6.** In some washrooms, paper cups in the shape of a cone are available. (One such cup is shown on the right.) Cylindrical paper cups with the same radius and height as the paper cup shown are also available. How much more water can the cylindrical cup hold compared to the cone-shaped cup, if the cups are both filled to the very top?



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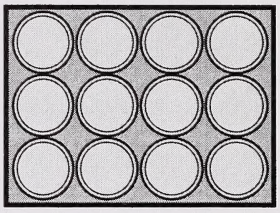
7. A new company is planning to sell frozen orange juice in boxes of 12 cans. Each can of orange juice is cylindrical with a height of 12 cm and a base diameter of 7 cm. The diagram shows a typical arrangement when the tins are packed in boxes of twelve.



(1) **a.** Determine the minimum length and width of the box.

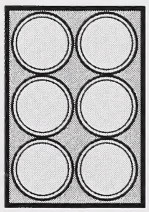
(1) **b.** Determine the volume of the box.

(2)

c. Determine the amount of space not used. Round your answer to the nearest whole number.

(2)

d. Another way to package the twelve cans is to have two layers with six cans in each layer. One layer is shown on the right. Would this box take more, less, or the same amount of cardboard compared to the box with only one layer? Explain.



Mathematics
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Module 3
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MATHEMATICS
Preparation 10

Module 3

Patterns and Algebra

Learning Technologies Branch

Assignment Booklet 3B

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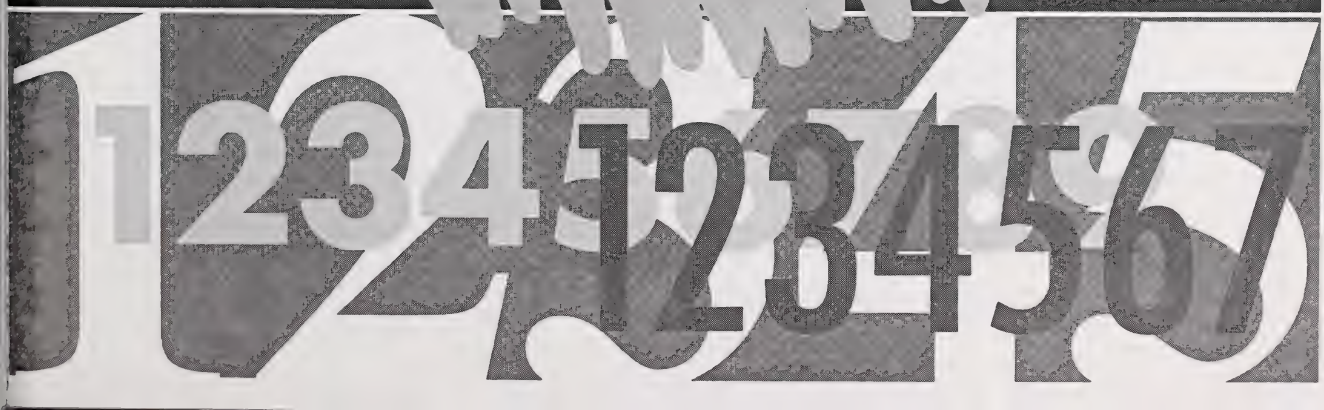

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Summary

	Total Possible Marks	Your Marks
Section 2 Assignment	45	
Final Module Assignment	30	
	75	

Teacher's Comments

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Parents	
General Public	
Other	

Mathematics Preparation 10
Module 3: Patterns and Algebra
Assignment Booklet 3B
Section 2 Assignment and Final Module Assignment
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ISBN 0-7741-1761-3

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ASSIGNMENT BOOKLET 3B
MODULE 3: PATTERNS AND ALGEBRA
SECTION 2 ASSIGNMENT AND FINAL MODULE ASSIGNMENT

Your mark for this module will be determined by how well you do your assignments in the Assignment Booklets.

This Assignment Booklet is worth 75 marks out of the total 100 marks for Module 3.

Work slowly and carefully. If you are having difficulties, go back and review the appropriate topic.

Be sure to proofread your answers carefully.

(45)

Section 2 Assignment: Solving Equations

Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.

1. Solve the following equations. Show your work, and verify your answers.

(2) **a.** $7x+3=-18$

(2) **b.** $-3x-8=6x+10$

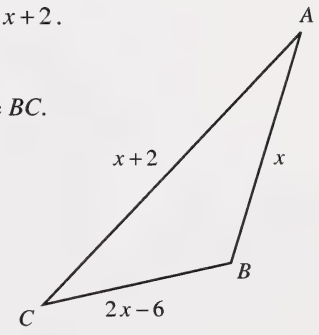
(2) **c.** $4(x-1)=3(2x-4)$

(2) **d.** $\frac{5-2x}{6}=\frac{1}{2}$

(2) **e.** $2(x-3)=14$

(2) **f.** $6.2x - 4.8 = -26.5$

2. The sides of the triangle shown have lengths of x, $2x - 6$, and $x + 2$.



(2) **a.** It is possible for this triangle to be an isosceles triangle (a triangle with two equal sides) if side AB is the same as side BC. For which value of x does this occur?

(1) **b.** Is it possible for the triangle to be an equilateral triangle (a triangle with three equal sides)? Explain.

_____

_____

_____

3. A student showed the following work in solving the equation $2(x-1)=12$.

Step 1: $2(x-1)=12$
Step 2: $2x-2=12$
Step 3: $2x=10$
Step 4: $x=5$

(1) **a.** Show that $x=5$ does not satisfy the original equation.

(1) **b.** Pretend this student is your study partner. Explain the student's error.

_____

_____

_____

(1) **c.** Determine the solution to $2(x-1)=12$.

4. Express each of the following formulas in terms of the variable shown in parentheses. Show your work.

(2) **a.** $A = \frac{1}{2}bh \qquad (b)$

(2) **b.** $V = \frac{1}{3}\pi r^2 h \qquad (h)$

(2) **c.** $A = \frac{(b_1 + b_2)}{2}h \qquad (h)$

(5) **5.** Using diagrams, model the steps required to solve the equation $3x + 6 = x - 4$. Write the equation each diagram represents.

6. Solve the following problems. Clearly indicate what your variable represents. Use equations and show how you arrived at your answer.

(4)

a. A family spent $150 at the grocery store. The items bought were either food or non-food items (such as paper towels). If the food items cost 4 times the cost of the non-food items, determine the cost of the food items.

(4)

b. The difference between two numbers is 8. If 3 times the larger number is equal to 4 times the smaller number, find both numbers.

(4)

c. Monica worked part-time at a job that paid $7.50/h and babysat for $4.00/h. In one week, she earned $110.00 working part-time and babysitting. If she worked part-time 7 more hours than the number of hours she babysat, determine the total number of hours she worked during this week.

(4)

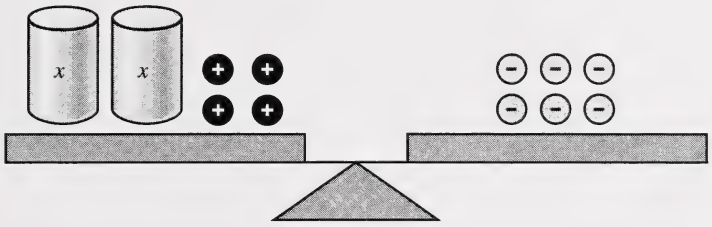
d. Martin has $5.50 in nickels and dimes in his piggy bank. If there are 20 more nickels than dimes, how many nickels does Martin have in his piggy bank?

30

Final Module Assignment

Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.

1. A model of an equation is given as follows.



(1) **a.** Write the equation that is modelled.

(3) **b.** Solve the equation using a model for each step.

(1) **2.** Determine whether $x = 7$ is a solution of $5x - 17 = 2x + 4$.

3. Solve the following equations, and check your answers.

(2) **a.** $5(x + 2) = 14$

(2) **b.** $2x - 3 = 12 - x$

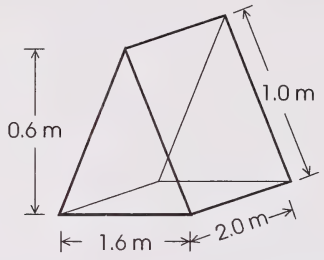
(2) c. $\frac{x}{2}+7=\frac{x}{3}$

(3) **4.** A mail-order toy company charges the following amounts for shipping and handling.

Cost of Merchandise	Cost of Shipping and Handling
up to $30.00	$6.00
$30.01 to $65.00	$8.00
$65.01 to $100.00	$10.00
over $100.00	$12.00

A customer buys the same game for 5 different children. All the games are being sent to the customer's home. The total bill, including shipping and handling, is $99.95. Determine the cost of one game.

5. A child's play tent has the following dimensions.

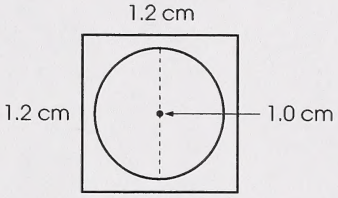


(4) **a.** If there is no material in the bottom of this tent, calculate the surface area.

(2) **b.** Determine the volume of the tent.

(4)

6. Pieces of wood, in the shape of rectangular prisms, are cut into lengths of 100 cm. A cross section of the rectangular pieces of wood is square with sides 1.2 cm (as shown on the right). From these pieces, cylindrical dowels with a diameter of 1 cm are cut. If the dowels are 100 cm long, how much wood is wasted when one dowel is cut from the rectangular pieces of wood? Round your answer to the nearest tenth.



(2) **7.** A cone-shaped pile of sand contains $5.4\ m^3$. If the pile of sand covers $8.1\ m^2$, how high is the pile of sand?

(4) **8.** If phone calls are made from 6 P.M. to 8 A.M. weekdays, all day Saturday, or all day Sunday, the price is 12¢ per minute to phone anywhere in Canada and 23¢ per minute to phone anywhere in the United States. Lisa is trying to decide whether to pay a flat amount of $20.75 for unlimited use during the times stated. Lisa predicts that she makes calls of equal length and that she makes five times as many calls within Canada as she does to the United States. How many minutes must Lisa talk per month to make the flat rate worthwhile? Define your variables in the equation.

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